determine species of *Eucinostomus,* indicate the inadequate knowledge of taxonomy of these fishes and the necessity of future studies.

The size of our specimens does not reflect the true population structure because we used only individuals larger than 77.1 mm SL. Our results may not apply to fishes smaller than this because of allometry.

Acknowledgments

We are very grateful to Dr. P. J. P. Whitehead (British Museum) (deceased) for his comments and constructive review of this paper. To Dr. E. Glazier for his advice. The senior author wishes to thank CICIMAR-IPN authorities for the assistance and support. Computer time was provided by the Computer Center of CICIMAR-IPN in La Paz, B.C.S., México.

Literature Cited

Amezcua, L. F. 1985. Recursos potenciales capturados con redes camaroneras en la costa del Pacífico de México. Pages 39–94 *in* A. A. Yañez, ed. Recursos pesqueros potenciales de México: la pesca acompañante del camarón. Prog. Univ. de Alim., Inst. Cienc. del Mar y Limnol. UNAM, México, D.F. Cap. 2.

Harrison, K. 1991. The taxonomy of East African Nile perch, *Lates* spp. (Perciformes: Centropomidae). J. Fish Biol. 38: 175–186.

Hubbs, C. L. and K. F. Lagler. 1958. Fishes of the Great Lakes, 2nd ed. University of Michigan Press, Ann Arbor. 213 pp.

Matheson, R. E. and J. D. McEachran. 1984. Taxonomic studies of the *Eucinostomus argenteus* complex (Pisces: Gerreidae): preliminary studies of external morphology. Copeia 1984: 893–902.

Nelson, J. S. 1984. Fishes of the world, 2nd ed. John Wiley and Sons, New York. 523 pp.

Van der Heiden, A. M. and L. T. Findley. 1988. Lista de los peces marinos del sur de Sinaloa, México. An. Cienc. del Mar y Limnol. Univ. Nal. Auton. México 15(2): 209–224.

Yañez, A. A. 1978. Taxonomía, ecología y estructura de las comunidades de peces en lagunas costeras con bocas efímeras del Pacífico de México. Centro de Ciencias del Mar y Limnología. Pub. Esp. No. 2. UNAM, México, D.F. 306 pp.

Zahuranec, B. V. 1967. The gerreid fishes of the genus *Eucinostomus* in eastern Pacific. Unpublished M.S. Dissertation, Univ. of California, La Jolla, California. 106 pp.

Date Accepted: May 19, 1992.

Address: *Department of Marine Biology, Centro Interdisciplinario de Ciencias Marinas, CICIMAR-IPN, P.O. Box 592, La Paz, B.C.S. 23000 México.*

BULLETIN OF MARINE SCIENCE, 52(2): 824–832, 1993

OCCURRENCE OF *CENTROSCYLLIUM FABRICII* (REINHARDT, 1825) (ELASMOBRANCHII, SQUALIDAE) IN THE BEAGLE CHANNEL, SOUTHERN SOUTH AMERICA

Roberto C. Menni, George H. Burgess and Mirta L. Garcia

The squalid shark genus *Centroscyllium* comprises a small group of seven or eight poorly known species with rather restricted distributions (Bigelow and Schroeder, 1948, 1954, 1957; Compagno, 1984; Melendez C. and Meneses R., 1986; Melendez, 1988; Shirai and Nakaya, 1990). The genus is being revised by Shigeru Shirai and George Burgess. Currently recognized species include the re-

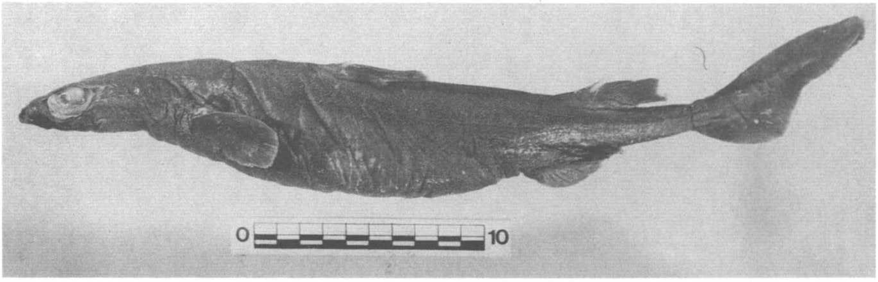

Figure 1. *Centroscyllium fabricii* (MLP 9-VIII-90-1), 378 mm female, captured off Ushuaia, Beagle Channel, Argentina.

cently described *excelsum* Shirai and Nakaya, 1990; *fabricii* (Reinhardt, 1825); *granulatum* Gunther, 1887; *kamoharai* Abe, 1966; *nigrum* (Garman, 1899); *ornatum* (Alcock, 1889); and *ritteri* Jordan and Fowler, 1903. The status of *C. ruscosum* Gilbert, 1905, often relegated to synonymy of *C. nigrum,* is questionable.

Until recently, the sole species from the western South Atlantic represented in collections was *C. granulatum,* originally described from the holotype captured in the Malvinas Islands off southern Argentina, and reported by Melendez C. and Meneses R. (1986) and Melendez (1988) from the Chilean slope in the eastern Pacific between Arica (18°25'S) and Isla Mocha (38°15'S). Fowler (1945) and Mann F. (1954) reported *C. fabricii* from Chile, but these reports probably refer to *C. granulatum* since we have examined numerous specimens of this species from the west coast of South America, but none of the former. More recently, Bahamonde and Pequeño (1975) do not include *C. fabricii* in their list of Chilean fishes.

An early listing of *C. fabricii* from the Malvinas by Lahille (1921) probably refers to *C. granulatum.* Bigelow and Schroeder (1948) erred in referring Lahille's listing to "*C. granulosum* Günther, 1880," actually *Spinax granulosus* (=*Etmopterus granulosus*), another squalid with the identical specific epithet described by Günther (1880) from off Chile prior to his equally brief description of *C. granulatum* in 1887 (Burgess and Springer, MS[1]; Krefft, 1968). Similarly, Pozzi and Bordale (1935) and Lopez (1963) are thought to have included *C. fabricii* on the basis of *C. granulatum,* while Menni et al. (1984) and Menni (1986) recorded the species correctly as *C. granulatum.* Lopez et al. (1989) reported, under the name *C. granulatum,* the material studied herein.

Three specimens of a *Centroscyllium* species (Fig. 1) were collected in the Argentine (northern) portion of the Beagle Channel by members of the Bioecologia de los Recursos Icticos del Canal Beagle research project, and were forwarded to the Laboratory of Ichthyology, Museo de La Plata, for further study. Initial use of the keys and descriptions of Bigelow and Schroeder (1948, 1957) and Compagno (1984), and later comparisons with *Centroscyllium* spp. material housed at the Florida Museum of Natural History revealed that these are referrable to *C. fabricii,* a predominantly northern species heretofore known only from as far south as the offing of Chesapeake Bay, U.S.A., in the western Atlantic. In the eastern Atlantic *C. fabricii* has been recorded southward to Liberia and then, disjunctly, from off Namibia to Cape Agulhas (Burgess, unpubl.; Compagno et al., 1989).

Measurements were made following criteria used by Springer (1979), Springer and Burgess (1985), Burgess and Springer (1986), and Yamakawa et al. (1986).

[1] Burgess, G. H. and S. Springer. A new species of the lantern shark genus *Etmopterus* (Elasmobranchii, Squalidae) from the eastern Pacific off Central America. Manuscript.

Table 1. Morphometric measurements of Argentinean *Centroscyllium fabricii* compared to specimens from throughout its range in the Atlantic Ocean. The relative changes in many proportions, expressed as percentages of total length (in parentheses), are functions of ontogenetic growth.

	UF 3974 U.S.A.	UF 44543 Iceland	Argentina	Argentina	UF 3974 U.S.A.	Argentina	UF 44758 Namibia
Total length (mm)	320	342	349	358	362	372	378
Sex	F	F	F	F	M	F	F
Tip of snout to:							
Anterior nasal aperture	7 (2)	5.5 (2)	—	5 (1)	7 (2)	5 (1)	6 (2)
Posterior nasal aperture	14 (4)	16 (5)	—	12 (3)	13 (4)	13.5 (4)	15 (4)
Front of mouth	31 (10)	29 (9)	—	27.9 (8)	29 (8)	29.4 (8)	29 (8)
Eye	20 (6)	20 (6)	18 (5)	20 (6)	23 (6)	20.5 (6)	18 (5)
Spiracle	47 (15)	44 (13)	35.5 (10)	34.5 (10)	47 (13)	39 (11)	41 (11)
First gill opening	70 (22)	63 (18)	59.5 (17)	58.2 (16)	64 (18)	63 (17)	56 (15)
Fifth gill opening	83 (26)	79 (23)	71 (20)	73.8 (21)	76 (21)	76 (20)	74 (20)
Pectoral fin origin	83 (26)	80 (23)	70.5 (20)	74.5 (21)	76 (21)	75 (20)	75 (20)
First dorsal fin origin	100 (31)	115 (34)	118 (34)	121 (34)	119 (33)	123.5 (33)	111 (29)
Pelvic fin origin	175 (55)	185 (54)	192 (55)	203 (57)	190 (52)	215 (58)	210 (56)
Second dorsal fin origin	180 (56)	204 (60)	202 (58)	219.1 (61)	205 (57)	226.5 (61)	224 (59)
Origin upper caudal lobe	235 (74)	256 (75)	271.5 (78)	280 (78)	265 (73)	294.5 (79)	285 (75)
Anus	170 (53)	198 (58)	209 (60)	220.5 (62)	204 (56)	236.0 (63)	222 (59)
Distance between fin bases:							
First–second dorsals	51 (16)	69 (20)	60 (17)	70 (20)	66 (18)	70.5 (19)	77 (20)
Second dorsal–caudal	21 (7)	30 (9)	32 (9)	36.5 (10)	23 (6)	34.5 (9)	30 (8)
Pectoral–pelvic	86 (27)	93 (27)	102 (29)	113 (32)	97 (27)	127 (34)	110 (29)
Pelvic–caudal	36 (11)	41 (12)	46.5 (13)	43.5 (12)	43 (12)	43.5 (12)	48 (13)
Length from caudal origin to:							
Tip 2nd dorsal free margin	10 (3)	14 (4)	14 (4)	19.1 (5)	15 (4)	18.1 (5)	20 (5)
Tip pelvic fin	14 (4)	26 (8)	27 (8)	28 (8)	29 (8)	24.2 (7)	34 (9)
Internarial distance	15 (5)	19 (6)	—	15.2 (4)	21 (6)	15 (4)	15 (4)
Orbit length	20 (6)	20 (6)	18 (5)	20 (6)	21 (6)	20.5 (6)	26 (7)
Orbit height	9 (3)	11 (3)	11.2 (3)	12.8 (4)	9 (3)	11.5 (3)	10 (3)
Upper labial furrow length	8 (3)	6 (2)	6.1 (2)	—	6 (2)	7.5 (2)	11 (3)
Lower labial furrow length	6 (2)	5 (2)	5.1 (2)	—	4 (1)	7.0 (2)	6 (2)
Mouth width	32 (10)	33 (10)	35 (10)	37.5 (11)	33 (9)	35.5 (10)	36 (10)
Mouth length	11 (3)	10 (3)	8.5 (2)	8 (2)	9 (3)	9 (2)	10.2 (3)

Table 1. Continued.

	UF 3974 U.S.A.	UF 44543 Iceland	Argentina	Argentina	UF 3974 U.S.A.	Argentina	UF 44758 Namibia
Spiracle greatest diameter	5 (2)	3 (1)	6.5 (2)	5.5 (2)	5 (1)	6.0 (2)	5 (1)
Eye to spiracle length	7 (2)	8 (2)	6 (2)	7 (2)	7 (2)	8.5 (2)	8 (2)
Gill opening 1 height	10 (3)	11 (3)	8 (2)	10 (3)	10 (3)	6 (2)	9 (2)
Gill opening 3 height	8 (3)	11 (3)	10 (4)	9.5 (3)	8 (2)	9 (2)	9 (2)
Gill opening 5 height	10 (3)	10 (3)	10 (4)	9.5 (3)	10 (3)	9.5 (3)	12 (3)
Interocular distance	29 (9)	35 (10)	30 (9)	34.1 (10)	32 (9)	34 (9)	29 (8)
First dorsal fin:							
Base	31 (10)	21 (6)	32.5 (9)	27.5 (8)	33 (9)	33.5 (9)	32 (9)
Inner margin	20 (6)	19 (6)	18.2 (5)	21 (6)	20 (6)	19 (5)	22 (6)
Height	16 (5)	13 (4)	damaged	12 (3)	16 (4)	15 (4)	15 (4)
Anterior margin	33 (10)	25 (7)	damaged	40 (11)	32 (9)	37 (10)	36 (10)
Spine	13 (4)	12 (4)	damaged	14.5 (4)	10 (3)	11 (3)	10 (3)
Exposed spine	10 (3)	11 (3)	damaged	10 (3)	10 (3)	11 (3)	10 (3)
Second dorsal fin:							
Base	30 (9)	31 (9)	36 (10)	31.5 (9)	32 (9)	35 (9)	36 (10)
Inner margin	18 (6)	16 (5)	19 (5)	18 (5)	20 (6)	18 (5)	19 (5)
Height	18 (6)	20 (6)	19 (5)	20 (6)	23 (6)	20 (5)	22 (6)
Anterior margin	43 (14)	37 (11)	37.5 (11)	41 (11)	42 (12)	44.5 (12)	42 (11)
Spine	29 (9)	23 (7)	28 (8)	24.5 (7)	21 (6)	26 (7)	24 (6)
Exposed spine	18 (6)	18 (5)	22.5 (6)	18.5 (5)	20 (6)	19.5 (5)	20 (5)
Pectoral fin:							
Base width	15 (5)	17 (5)	17 (5)	18 (5)	17 (5)	23 (6)	15 (4)
Anterior marign	27 (9)	29 (9)	30 (9)	31 (9)	25 (7)	37 (10)	38 (10)
Greatest width	27 (9)	24 (7)	26 (7)	28 (8)	27 (8)	27 (7)	26 (7)
Maximum length	34 (11)	34 (10)	35 (10)	35.5 (10)	36 (10)	38 (10)	42 (11)
Pelvic fin:							
Overall length	42 (13)	42 (12)	44 (13)	45 (13)	43 (12)	45.5 (12)	43 (11)
Anterior margin	15 (5)	21 (6)	23 (7)	21 (6)	18 (5)	24.5 (7)	25 (7)
Distal margin	26 (8)	23 (7)	29 (8)	29.8 (8)	26 (7)	29 (8)	29 (8)

Table 1. Continued.

	UF 3974 U.S.A.	UF 44543 Iceland	Argentina	Argentina	UF 3974 U.S.A.	Argentina	UF 44758 Namibia
Caudal fin:							
Upper lobe, outer margin	84 (26)	90 (26)	76 (22)	68.5 (19)	94 (26)	75 (20)	84 (22)
Lower lobe, outer margin	34 (11)	43 (13)	37.5 (11)	39.5 (11)	43 (12)	42 (11)	41 (11)
Upper lobe, tip to notch	20 (6)	20 (6)	18 (5)	14.5 (4)	22 (6)	18 (5)	25 (7)
Trunk width at:							
Pectoral fin origin	—	38 (11)	47 (14)	52 (15)	—	48 (13)	42 (11)
Pelvic fin origin	17 (5)	20 (6)	—	—	16 (4)	30 (8)	23 (6)
Caudal fin origin	5 (2)	6 (2)	7 (2)	7 (2)	6 (2)	7.5 (2)	6 (2)
Trunk height at:							
Pectoral fin origin	—	37 (11)	40 (12)	33.5 (9)	—	36 (10)	36 (10)
Pelvic fin origin	21 (7)	29 (9)	—	—	22 (6)	28.2 (8)	23 (6)
Caudal fin origin	9 (3)	10 (3)	10 (3)	10.2 (3)	9 (3)	10 (3)	11 (3)

Study Material.—*Centroscyllium fabricii*: MLP 9-VIII-90-1, three females, 349, 358 and 372 mm total length (TL), off Ushuaia, Beagle Channel, Argentina, 54°50'S, 68°20'W, 1987; UF 3974, 320 mm TL female and 362 mm TL male, off Delaware, U.S.A., 1,152–1,234 m, 30 June 1953; UF 44543, 342 mm TL female, off Iceland, 1,505–1,510 m, 9 March 1986; UF 44758, 378 mm female, off Namibia, 652 m, 9 September 1984.

Specimens of *C. granulatum* (•), *C. kamoharai*, *C. nigrum* (•), *C. ritteri* (•), and *C. ruscosum* (•) deposited at the Florida Museum of Natural History and other institutions, including types (indicated by •), were available for comparison.

Description.—Proportional measurements of Argentinean specimens expressed as percentages of total length:

Trunk at origin of pectoral: width 13–15, height 9–12; snout length in front of: outer nostrils 1, mouth 8; horizontal diameter eye 5–6; mouth: width 10–11, length 2; labial furrow length: upper 2, lower 2; gill opening height: 1st 2–3, 3rd 2–4, 5th 3–4; first dorsal fin: height 3–4, base 8–9; second dorsal fin: height 5–6, base 9–10; caudal fin: upper outer margin 19–22, lower outer margin 11; pectoral fin: maximum length 10, maximum width 7–8; distance from tip of snout to origin of: first dorsal 33–34, second dorsal 58–61, upper caudal 78–79, pectoral 20–21, pelvic 55–58; interspace between fin bases: first dorsal-second dorsal 17–20, second dorsal-upper caudal 9–10, pectoral-pelvic 29–34, pelvic-lower caudal 12–13.

Height of trunk at level of first dorsal fin 12–14 of precaudal length (PCL); head 26 of PCL. Preoral length (POL) 38–39 of head length; prenarial length 17–18 of POL; internarial 51–55 of POL; horizontal diameter of eye (HDE) 70–72 of POL.

Origin of first dorsal fin (D1) clearly posterior to adpressed pectoral fin tips (by about ⅔ HDE); inner margin D1 56–76 of its base; D1 spine located approximately ⅓ way between pectoral insertion and pelvic origin; exposed portion D1 spine 50–54 of HDE.

Second dorsal fin (D2) base 105–115 of D1 base; D2 inner margin 51–57 of its base; D2 spine located over posterior ⅓ of pelvics; interspace between D2 and caudal 89–116 D2 base; origin of pelvics clearly anterior to D2 origin. Anterior margin pectoral fin 42–44 of head length.

Complete morphometric measurements of Argentinean specimens are included in Table 1.

At first sight the preserved specimens appear black but they are uniformly dark brown dorsally, darker ventrally; no other marking apparent. Teeth tricuspidate, in three functional rows. Dermal denticles are thorn-like spines erupting out of stellate bases.

Discussion

Comparisons of proportional measurements of the Beagle Channel material with those provided by Bigelow and Schroeder (1948) and specimens of a graded size series of *C. fabricii* from throughout its range show good agreement (Table 1). Dermal denticles of *C. fabricii* are described by Bigelow and Schroeder (1948, 1957) as "in the form of spines or thorns on stellate bases" and are illustrated in the 1948 work. Our SEM photographs of denticles from the head (Fig. 2) and trunk (Fig. 3) are consistent with these illustrations and descriptions, including the mid-spine curvature. Slight differences are observed between head and trunk denticles, a trend common in squaloid sharks. The distribution of scales on the body surface is rather regular.

The 358 mm/151 g (eviscerated weight) specimen was dissected for biological data. Stomach contents included digested fishes and crustaceans (probably the crab *Lithodes antarcticus*). The two ovaries contained a total of eight ova weighing 56.18 g and measuring from 19.7–25.5 mm ($\bar{x}$ = 22.7, N = 5), and the liver

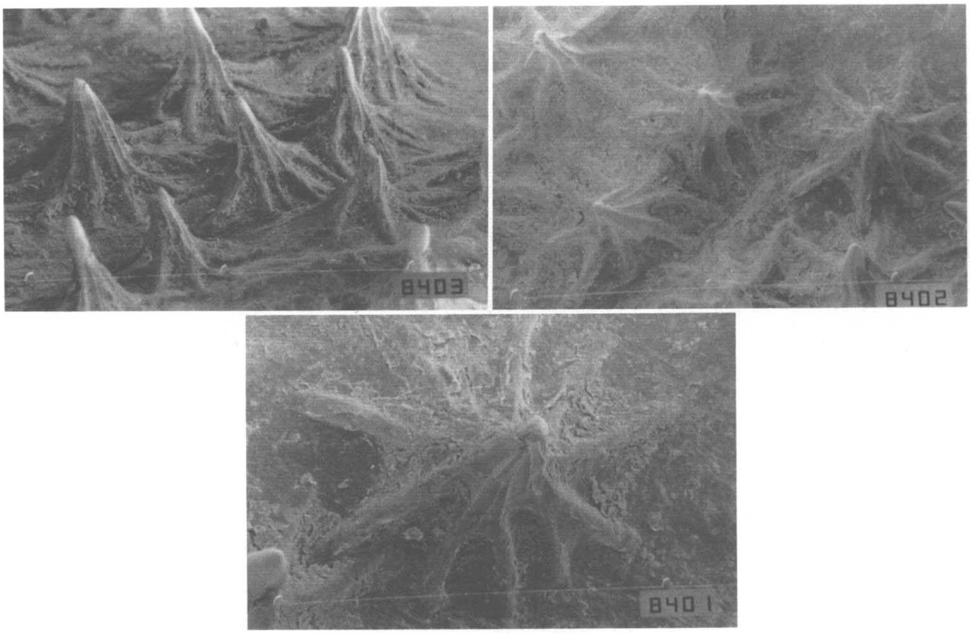

Figure 2. Dermal denticles of *Centroscyllium fabricii* (MLP 9-VII-90-1): head denticles. A left) Oblique lateral view (50×); B right) Top view (50×); C bottom) Top view, single denticle (100×).

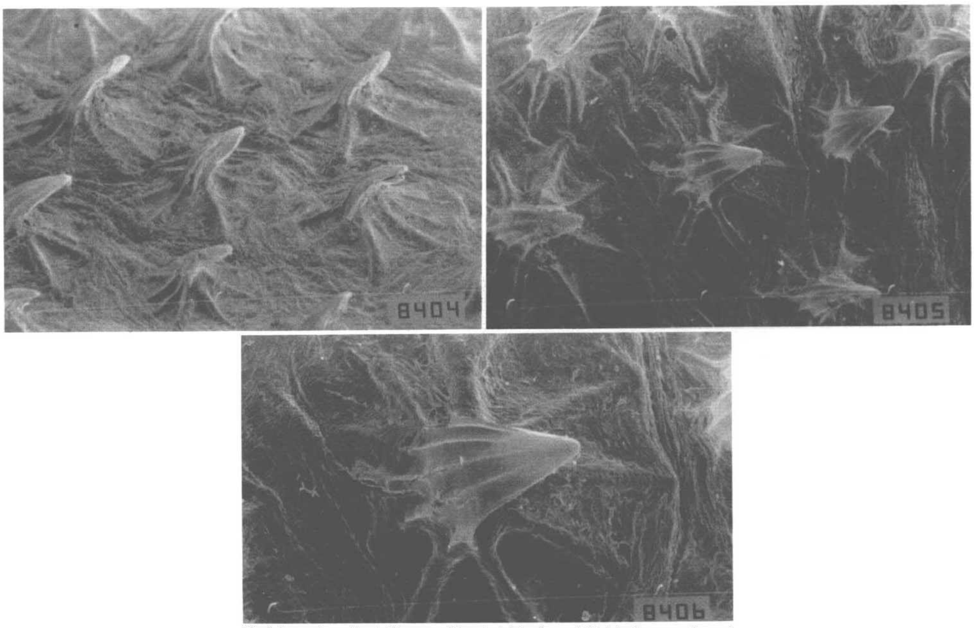

Figure 3. Dermal denticles of *Centroscyllium fabricii* (MLP 9-VII-90-1): trunk denticles at level of first dorsal fin. A left) Oblique lateral view (50×); B right) Oblique top view (50×); C bottom) Top view, single denticle (100×).

weighed 47.64 g. The liver from the 349 mm /134 g (eviscerated weight) specimen weighed 32.48 g. The 372 mm specimen had a total weight of 295 g.

Beagle Channel specimens of *C. fabricii* were collected in shallow waters of less than 130 m depth. *C. fabricii* is considered a deepwater species that is largely confined to the deepest continental shelf and upper slope waters (Burgess, unpubl. data; Compagno, 1984). In the northern portion of its range "it may move to near the surface, especially during the winter and when darkest" (Compagno, 1984) and in the western North Atlantic it is found in shallower waters in the northern part of its range than in the south (Burgess, unpubl. data). Presumably the shallow depths of capture of the Beagle Channel material is similarly related to water temperature. Water temperature from the coast line to 20 m depth in the capture area (February 1987 to November 1989 data) range from 3.2–11.7°C at the surface and from 4.8–11.7°C at the bottom.

The distributions of squaloid sharks is both interesting and perplexing. The geographic ranges of many squalid species are poorly known because of inadequate and/or inappropriate sampling. The development of larger and more efficient bottom and midwater trawls, increases in deepwater longline fishing effort, and accelerated worldwide exploratory fishing activities have demonstrated that many species thought to be rare are in fact much more numerous and far more widespread. Although Argentinean waters have been well sampled in German and Japanese fisheries investigations, the few specimens collected make it difficult to determine if the Beagle Channel *C. fabricii* represent an established population or simply transient waifs. Based on zoogeographical considerations and our knowledge of squaloids, however, it seems quite reasonable to assume that this species is a resident of the region. Similar antitropical patterns of distribution are also evident in the squalid genera *Etmopterus* and *Squalus* (Burgess and Springer, MS).[1] The scarcity of *C. fabricii* in the southwest Atlantic is puzzling, however, since this species is abundant throughout its range in the North Atlantic.

Acknowledgments

We thank L. Kozuch for laboratory assistance and D. Carver for typing Table 1. The financial support of Robert C. Dorion is gratefully acknowledged.

Literature Cited

Bahamonde, N. N. and R. G. Pequeño. 1975. Pisces de Chile. Lista systematica. Mus. Natur. Hist. Nat., Pub. Ocas. 21: 3–20.

Bigelow, H. B. and W. C. Schroeder. 1948. Sharks. Pages 59–546 *in* J. Tee-Van, C. M. Breder, A. E. Parr, W. C. Schroeder and L. P. Schultz, eds. Fishes of the western North Atlantic. Sears Foundation for Marine Research, New Haven, Connecticut.

——— and ———. 1954. Deep water elasmobranchs and chimaeroids from the northwestern Atlantic slope. Bull. Mus. Comp. Zool., Harvard 112(2): 37–87.

——— and ———. 1957. A study of the sharks of the suborder Squaloidea. Bull. Mus. Comp. Zool., Harvard 117(1): 1–150 + 4 pl.

Burgess, G. H. and S. Springer. 1986. The hook-tooth shark, *Aculeola nigra* DeBuen (family Squalidae) of the eastern South Pacific. Pages 189–196 *in* T. Uyeno, R. Arai, T. Taniuchi and K. Matsuura, eds. Indo-Pacific fish biology. Ichthyological Society of Japan, Tokyo.

Compagno, L. J. V. 1984. FAO species catalogue, Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 1. Hexanchiformes to Lamniformes. FAO Fish. Synop. [125] 4(1). 249 pp.

———, D. A. Ebert and M. J. Smale. 1989. Guide to the sharks and rays of Southern Africa. New Holland (Publishers) Ltd., London. 158 pp.

Fowler, H. W. 1945. Fishes of Chile. Systematic catalog. Rev. Chilena Hist. Nat. 45–47: 1–171.

Günther, A. 1880. Report on the shore fishes procured during the voyage of H.M.S. Challenger in the years 1873–1876. Rep. Sci. Results Voyage H.M.S. Challenger 1873–76, Zool., London 1(6): 1–82 + 32 figs.

———. 1887. Report on the deep-sea fishes collected by H.M.S. Challenger during the years 1873–1876. Rep. Sci. Results Voyage H.M.S. Challenger 1873–76, Zool., London 22(57): 1–268 + 66 pl.

Krefft, G. 1968. Neue und erstmalig nachgewiesene Knorpelfische aus dem Archibenthal des Südwestatlantiks, einschiesslich einer Diskussion einiger *Etmopterus*—Arten sudlicher Meere. Arch. Fischereiwiss. 19(1): 1–42.

Lahille, F. 1921. Enumeración de los peces cartilaginos, plectognátos y gimnótidos, encuntrados en las aguas argentinas. Min. Agric. Nat., Lab. Zool. 41 pp. + 15 figs. + 1 tab.

Lopez, H. L., M. L. Garcia and N. A. San Roman. 1989. Ictiofauna del canal Beagle (Sector Argentino). Neotropica 35(93): 50.

Lopez, R. B. 1963. Peces marinhos de la República Argentina. Consejo Fed. de Inv. Eval. Recursos Nat., Argentina 7(3): 105–219.

Mann F., G. 1954. Vida de los peces en aguas chilenas. Inst. Invest. Vetern. Santiago de Chile. 342 pp.

Melendez, R. 1988. Sharks of the Chilean continental slope. Amer. Soc. Ichthyol. Herpetol., Abstr. 1988 Ann. Mtg., Ann Arbor, Michigan, p. 141.

Melendez C., R. and D. Meneses. 1986. Tiburones del talud continental chileno (18°25'S–38°15'S): Squalidae. Prog. Cient. Resúm., X Congreso Lat. Amer. Zool., Viña del Mar, Chile: 286.

Menni, R. C. 1986. Shark biology in Argentina: a review. Pages 425–436 *in* T. Uyeno, R. Arai, T. Taniuchi and K. Matsuura, eds. Indo-Pacific biology. Ichthyological Society of Japan, Tokyo.

Menni, R. C., R. A. Ringuelet and H. Aramburu. 1984. Peces marinos de la Argentina y Uruguay. Ed. Hemisferio Sur, Buenos Aires. 359 pp.

Pozzi, A. J. and L. F. Bordale. 1935. Cuadro sistemático de los marinos de la Argentina. An. Soc. Cient. Argentina 120(1): 145–189.

Shirai, S. and K. Nakaya. 1990. A new squalid species of the genus *Centroscyllium* from the Emperor Seamount Chain. Japan. J. Ichthyol. 36(4): 391–398.

Springer, S. 1979. A revision of the catsharks, family Scyliorhinidae. U.S. Natl. Mar. Fish. Serv., NOAA Tech. Rep. NMFS 422. 152 pp.

——— and G. H. Burgess. 1985. Two new dwarf dogsharks (*Etmopterus*, Squalidae), found off the Caribbean coast of Columbia. Copeia 1985: 584–591.

Yamakawa, T., T. Taniuchi and Y. Nose. 1986. Review of the *Etmopterus lucifer* group (Squalidae) in Japan. Pages 197–207 *in* T. Uyeno, R. Arai, T. Taniuchi and K. Matsuura, eds. Indo-Pacific biology. Ichthyological Society of Japan, Tokyo.

DATE ACCEPTED: July 27, 1992.

ADDRESSES: *(R.C.M., M.L.G.) Museo de La Plata, Universidad Nacional de La Plata, La Plata, Argentina; (G.H.B.) Florida Museum of Natural History, University of Florida, Gainesville, Florida 32611.*

BULLETIN OF MARINE SCIENCE, 52(2): 832–837, 1993

1987 CORAL REEF BLEACHING AT CABO PULMO REEF, GULF OF CALIFORNIA, MEXICO

Héctor Reyes-Bonilla

The bleaching of stony corals has been cause of concern the last few years, mainly for its widespread geographical occurrence and the mortality of affected coral colonies. Two important papers have reviewed the available information (Brown, 1987; Williams and Williams, 1990). Both mention that bleachings can be caused by many different circumstances, but it is recognized that the global events of the last decade may have high temperature of the ocean water as its most possible origin.

During 1983, the eastern Pacific region suffered massive coral mortalities caused by "El Niño" Southern Oscillation (80% of the living coral cover in some areas)